

THAT WHICH IS CLAIMED IS:

1. A method of processing a spread spectrum signal, the method comprising:

5 correlating the spread spectrum signal with a spreading sequence at a first plurality of correlation times to produce a first plurality of time-offset correlations;

processing the first plurality of time-offset correlations to produce a first symbol representation for a symbol;

determining a first quality for the first symbol representation; and

10 responsive to the determined first quality, determining whether to further process the first symbol representation or to process a second symbol representation for the symbol generated from the spread spectrum signal.

2. The method of Claim 1, comprising generating the second symbol representation from the spread spectrum signal before determining whether to further process the first symbol representation or to process the second symbol representation for the symbol generated from the spread spectrum signal.

3. The method of Claim 1, comprising generating the second symbol representation from the spread spectrum signal after determining whether to further process the first symbol representation or to process the second symbol representation for the symbol generated from the spread spectrum signal.

4. The method of Claim 1, wherein determining a first quality for the first symbol representation comprises:

25 decoding the first symbol representation; and

determining the first quality responsive to the decoding of the first symbol representation.

5. The method of Claim 4:

30 wherein decoding the first symbol representation comprises decoding the first symbol representation to generate decoded data; and

wherein determining the first quality responsive to the decoding of the first symbol representation comprises error checking the decoded data.

6. The method of Claim 5, wherein error checking the decoded data  
5 comprises performing at least one of a cyclic redundancy check (CRC), a bit error rate determination, and a Reed-Solomon decoding of the decoded data.

7. The method of Claim 5, wherein determining the first quality  
responsive to the decoding of the first symbol representation comprises generating a  
10 decoding metric as part of the decoding of the first symbol representation.

8. The method of Claim 1, wherein determining a first quality for the first  
symbol representation comprises determining a soft output that indicates a level of  
confidence in the first symbol representation.  
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9. The method of Claim 1, wherein the first symbol representation is an  
output of a RAKE demodulation process and wherein the second symbol  
representation is an output of a generalized RAKE (G-RAKE) demodulation process.

10. The method of Claim 9, wherein determining whether to further  
process the first symbol representation or to process a second symbol representation is  
preceded by:  
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generating the second symbol representation from the spread spectrum signal  
according to the G-RAKE demodulation process;

25 storing the first and second symbol representations; and

determining a second quality for the second symbol representation; and

wherein determining whether to further process the first symbol representation  
comprises determining whether to process the stored first symbol representation or the  
second symbol representation based on a comparison of the first quality and the  
30 second quality.

11. The method of Claim 1, wherein determining whether to further process the first symbol representation or to process a second symbol representation for the symbol generated from the spread spectrum signal comprises determining whether to further process first decoded data corresponding to the first symbol  
5 representation or second decoded data corresponding to the second symbol representation.

12. A method of processing a spread spectrum signal, the method comprising:  
10 correlating the spread spectrum signal with a spreading sequence at a first plurality of correlation times to produce a first plurality of time-offset correlations;  
processing the first plurality of time-offset correlations to produce a first symbol representation for a symbol;  
determining a first quality for the first symbol representation; and  
15 responsive to the determined first quality failing to meet a predetermined criterion, processing a second plurality of time-offset correlations of the spread spectrum signal with the spreading sequence to produce a second symbol representation.

20 13. The method of Claim 12, wherein the first and second pluralities of time-offset correlations are both generated before processing the first plurality of time-offset correlations to produce the first symbol representation.

14. The method of Claim 12, wherein the second plurality of time-offset  
25 correlations is generated responsive to the first quality failing to meet the predetermined criterion.

15. The method of Claim 12, wherein processing a second plurality of time-offset correlations of the spread spectrum signal with the spreading sequence to  
30 produce the second symbol representation responsive to the determined first quality failing to meet a predetermined criterion is preceded by correlating the spread

spectrum signal with the spreading sequence at a second plurality of correlation times to produce the second plurality of time-offset correlations.

16. The method of Claim 15, further comprising determining the first and  
5 second pluralities of correlation times based on a channel estimate.

17. The method of Claim 16, wherein determining the first and second  
pluralities of correlation times based on a channel estimate comprises the step of  
determining a first one of the first and second pluralities of correlation times based on  
10 a channel estimate and determining a second one of the first and second pluralities of  
correlation times based on a channel estimate and information regarding an interfering  
spread spectrum signal.

18. The method of Claim 12:  
15 wherein processing the first plurality of time-offset correlations to produce a  
first symbol representation for a symbol comprises combining the first plurality of  
time-offset correlations according to a first combination scheme to produce the first  
symbol representation; and

wherein processing a second plurality of time-offset correlations of the spread  
20 spectrum signal with the spreading sequence to produce the second symbol  
representation for the symbol responsive to the determined first quality failing to meet  
a predetermined criterion comprises combining the second plurality of time-offset  
correlations according to a second combination scheme to produce the second symbol  
representation.

19. The method of Claim 18, further comprising determining a first one of  
the first and second combination schemes from a channel estimate and determining a  
second one of the first and second combination schemes from a channel estimate and  
information regarding an interfering spread spectrum signal.

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20. The method of Claim 12, wherein processing a second plurality of time-offset correlations to produce the second symbol representation responsive to the first quality failing to meet a predetermined criterion is followed by:

- determining a second quality for the second symbol representation; and
- 5 further processing a selected one of the first and second symbol representations based on a comparison of the determined first and second qualities.

21. The method of Claim 12, wherein generation of the first symbol representation consumes less of a selected resource than generation of the second  
10 symbol representation.

22. The method of Claim 12, wherein determining a first quality for the first symbol representation comprises:

- decoding the first symbol representation; and
- 15 determining the first quality responsive to the decoding of the first symbol representation.

23. The method of Claim 22:

- wherein decoding the first symbol representation comprises decoding the first  
20 symbol representation to generate decoded data; and

wherein determining the first quality responsive to the decoding of the first symbol representation comprises error checking the decoded data.

24. The method of Claim 23, wherein error checking the decoded data  
25 comprises performing at least one of a cyclic redundancy check (CRC), a bit error rate determination, and a Reed-Solomon decoding of the decoded data.

25. The method of Claim 23, wherein determining the first quality  
responsive to the decoding of the first symbol representation comprises generating a  
30 decoding metric as part of the decoding of the first symbol representation.

26. The method of Claim 12, wherein determining a first quality for the first symbol representation comprises determining a soft output that indicates a level of confidence in the first symbol representation.

5 27. The method of Claim 12, wherein the first symbol representation is an output of a RAKE demodulation process and wherein the second symbol representation is an output of a generalized RAKE (G-RAKE) demodulation process.

10 28. The method of Claim 12, wherein determining whether to further process the first symbol representation or to process a second symbol representation for the symbol generated from the spread spectrum signal comprises determining whether to further process first decoded data corresponding to the first symbol representation or second decoded data corresponding to the second symbol representation.

15 29. The method of Claim 12, wherein the order in which the first and second symbol representations are generated is adaptively selected.

20 30. The method of Claim 29, wherein the order in which the first and second symbol representations are generated is selected responsive to a decoding history.

25 31. The method of Claim 29, wherein the order in which the first and second symbol representations are generated is selected based on a decoding history of at least one of a slot and a frame.

32. A method of processing a spread spectrum signal, the method comprising:  
correlating the spread spectrum signal with a spreading sequence at respective  
30 first and second pluralities of correlation times to produce respective first and second pluralities of time-offset correlations;

processing respective ones of the first and second pluralities of time-offset correlations to produce respective first and second symbol representations for a symbol;

- 5       determining at least one quality for at least one of the first and second symbol representations; and
- responsive to the determined at least one quality, determining whether to further process one of the first symbol representation or the second symbol representation.

- 10       33.     The method of Claim 32, wherein determining at least one quality for at least one of the first and second symbol representations comprises:
- decoding at least one of the first and second symbol representations; and
- determining the at least one quality responsive to the decoding of the at least one of the first and second symbol representations.

- 15       34.     The method of Claim 33:
- wherein decoding at least one of the first and second symbol representations comprises decoding at least one of the first and second symbol representations to generate corresponding decoded data; and
- 20       wherein determining the at least one quality responsive to the decoding of the at least one of the first and second symbol representations comprises error checking the decoded data.

35.     The method of Claim 34, wherein error checking the decoded data
- 25       comprises performing at least one of a cyclic redundancy check (CRC), a bit error rate determination, and a Reed-Solomon decoding of the decoded data.

36.     The method of Claim 34, wherein determining the at least one quality responsive to the decoding of the at least one of the first and second symbol
- 30       representations comprises generating at least one decoding metric as part of the decoding of the at least one of the first and second symbol representations.

37. The method of Claim 32, wherein determining a least one quality for at least one of the first and second symbol representations comprises determining at least one soft output that indicates level of confidence in the at least one of the first and second symbol representations.

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38. The method of Claim 32:

wherein determining at least one quality for at least one of the first and second symbol representations comprises determining respective first and second qualities for respective ones of the first and second symbol representations; and

10 wherein determining whether to further process one of the first symbol representation or the second symbol representation based on the determined at least one quality comprises determining whether to further process one of the first and second symbol representations based on a comparison of the determined first and second qualities.

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39. The method of Claim 32:

wherein determining at least one quality for at least one of the first and second symbol representations comprises:

20 decoding a first selected one of the first and second symbol representations to generated first decoded data; and

determining a corresponding decoding quality responsive to the decoding of the first selected one of the first and second symbol representations; and

25 wherein determining whether to further process one of the first symbol representation or the second symbol representation based on the determined at least one quality comprises determining whether to further process the first decoded data or to decode a second selected one of the first and second symbol representations to generate second decoded data based on the determined decoding quality.

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40. The method of Claim 39, wherein decoding a first selected one of the first and second symbol representations to generate first decoded data is preceded by



adaptively selecting the first selected one of the first and second symbol representations.

41. The method of Claim 40, wherein the first selected one of the first and second symbol representations is selected based on a decoding history.

42. The method of Claim 40, wherein the first selected one of the first and second symbol representations is selected based on a decoding history of at least one of a slot and a frame.

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43. The method of Claim 32:  
wherein determining at least one quality for at least one of the first and second symbol representations comprises:

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partially decoding respective ones of the first and second symbol representations; and

determining respective first and second qualities for respective ones of the first and second symbol representations responsive to the partial decoding of the first and second symbol representations; and

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wherein determining whether to further process one of the first symbol representation or the second symbol representation based on the determined at least one quality comprises determining whether to further decode one of the first or second symbol representations based on a comparison of the determined first and second qualities.

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44. The method of Claim 32:  
wherein determining at least one quality for at least one of the first and second symbol representations comprises:

syndrome decoding respective ones of the first and second symbol representations; and

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determining respective first and second qualities for respective ones of the first and second symbol representations responsive to the syndrome decoding of the first and second symbol representations; and

wherein determining whether to further process one of the first symbol representation or the second symbol representation based on the determined at least one quality comprises determining whether to further decode one of the first or second symbol representations based on a comparison of the determined first and  
5 second qualities.

45. The method of Claim 32, further comprising determining the first and second pluralities of correlation times based on a channel estimate.

10 46. The method of Claim 45, wherein determining the first and second pluralities of correlation times based on a channel estimate comprises the step of determining a first one of the first and second pluralities of correlation times based on a channel estimate and determining a second one of the first and second pluralities of correlation times based on a channel estimate and information regarding an interfering  
15 spread spectrum signal.

47. The method of Claim 32, wherein processing respective ones of the first and second pluralities of time-offset correlations to produce respective first and second symbol representations for a symbol comprises combining respective ones of  
20 the first and second pluralities of time-offset correlations according to respective first and second combination schemes to produce respective ones of the first and second symbol representations.

48. The method of Claim 47, further comprising determining a first one of  
25 the first and second combination schemes from a channel estimate and determining a second one of the first and second combination schemes from a channel estimate and information regarding an interfering spread spectrum signal.

49. The method of Claim 32, wherein the first symbol representation is an  
30 output of a RAKE demodulation process and wherein the second symbol representation is an output of a generalized RAKE (G-RAKE) demodulation process.

50. A method of processing a spread spectrum signal, the method comprising:

demodulating the spread spectrum signal according to a first demodulation process to generate a first symbol representation for a symbol;

5 determining a first quality for the first symbol representation; and responsive to the determined first quality, determining whether to further process the first symbol representation or to process a second symbol representation that is generated from the spread spectrum signal according to a second demodulation process.

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51. The method of Claim 50, wherein the first and second demodulation processes are operative to provide different levels of performance in a given interference environment.

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52. The method of Claim 50, wherein the spread spectrum signal comprises a first spread spectrum signal, wherein a first one of the first and second demodulation processes is operative to provide superior performance in an interference environment dominated by one or more second spread spectrum signals transmitted from one or more signal sources other than a source of the first spread spectrum signal, and wherein a second one of the first and second demodulation process is operative to provide superior performance in an interference environment dominated by one or more third spread spectrum signals transmitted from the source of the first spread spectrum signal.

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25 53. The method of Claim 50, wherein the first and second symbol representations are generated in series.

54. The method of Claim 50, wherein the first and second symbol representations are generated in parallel.

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55. The method of Claim 54:

wherein determining whether to further process the first symbol representation or to process a second symbol representation that is generated from the spread spectrum signal according to a second demodulation process is preceded by determining a second quality for the second symbol representation; and

5        wherein determining whether to further process the first symbol representation or to process a second symbol representation that is generated from the spread spectrum signal according to a second demodulation process comprises determining whether to further process the first symbol representation or to further process the second symbol representation based on a comparison of the first and second qualities.

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56.     The method of Claim 50:

wherein determining whether to further process the first symbol representation or to process a second symbol representation that is generated from the spread spectrum signal according to a second demodulation process is preceded by

15        generating the second symbol representation;

wherein determining whether to further process the first symbol representation or to process a second symbol representation that is generated from the spread spectrum signal according to a second demodulation process comprises determining whether to further process the first symbol representation or to further process the  
20        second symbol representation based on a decoding of one of the first and second symbol representations.

57.     The method of Claim 50, wherein a first one of the first and second demodulation processes comprises a RAKE demodulation process, and wherein a  
25        second one of the first and second demodulation processes comprises a generalized RAKE (G-RAKE) demodulation process.

58.     A method of processing a communications signal, the method comprising:

30        demodulating the communications signal according to respective first and second demodulation processes to produce respective first and second symbol representations;

decoding a first one of the first and second symbol representations to  
determine a quality for the first one of the first and second symbol representations;  
and

responsive to the determined quality, determining whether to further process  
5 the first symbol representation or to decode the second symbol representation.

59. The method of Claim 58, wherein the first and second demodulation  
processes comprise respective first and second spread spectrum demodulation  
processes.

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60. The method of Claim 59, wherein the first and second demodulation  
processes comprise respective ones of a RAKE demodulation process and a  
generalized RAKE (G-RAKE) demodulation process.

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61. The method of Claim 58, wherein the first and second demodulation  
processes comprise respective non-spread spectrum demodulation processes.

62. The method of Claim 58, comprising adaptively selecting the first one  
of the first and second symbol representations for first decoding.

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63. The method of Claim 62, wherein adaptively selecting the first one of  
the first and second symbol representations for first decoding comprises selecting the  
first one of the first and second symbol representations for first decoding responsive  
to a partial decoding of at least one of the first and second symbol representations.

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64. The method of Claim 62, wherein adaptively selecting the first one of  
the first and second symbol representations for first decoding comprises selecting the  
first one of the first and second symbol representations for first decoding responsive  
to a syndrome decoding of the first and second symbol representations.

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65. The method of Claim 62, wherein symbol representations produced by  
the first and second demodulation processes comprise soft values that indicate a level

of confidence in the symbol representations, and wherein adaptively selecting the first one of the first and second symbol representations for first decoding comprises selecting the first one of the first and second symbol representations for first decoding responsive to the soft output values.

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66. The method of Claim 65, wherein selecting the first one of the first and second symbol representations for first decoding responsive to the soft output values comprises selecting the first one of the first and second symbol representations for first decoding responsive to a history of the soft output values produced by the first and second demodulation processes.

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67. The method of Claim 62, wherein adaptively selecting the first one of the first and second symbol representations for first decoding comprises selecting the first one of the first and second symbol representations for first decoding based on a decoding history.

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68. The method of Claim 67, wherein the decoding history comprises a decoding history of at least one of slot and a frame.

69. A spread spectrum receiver, comprising:

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a multi-process demodulator circuit operative to process a spread spectrum signal according to respective first and second demodulation processes to produce respective first and second symbol representations for a symbol; and

a quality discriminator circuit operative to selectively output decoded data corresponding to a selected one of the first and second symbol representations based on a quality of at least one of the first and second symbol representations.

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70. A receiver according to Claim 69, wherein the first and second demodulation processes are operative to provide different levels of performance in a given interference environment.

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71. A receiver according to Claim 69, wherein the spread spectrum signal comprises a first spread spectrum signal, wherein a first one of the first and second demodulation processes is operative to provide superior performance in an interference environment dominated by one or more second spread spectrum signals transmitted from one or more signal sources other than a source of the first spread spectrum signal, and wherein a second one of the first and second demodulation process is operative to provide superior performance in an interference environment dominated by one or more third spread spectrum signals transmitted from the source of the first spread spectrum signal.

72. A receiver according to Claim 69, wherein the multi-process demodulator circuit is operative to generate the first and second symbol representations in series.

73. A receiver according to Claim 69, wherein the multi-process demodulator circuit is operative to generate the first and second symbol representations in parallel.

74. A receiver according to Claim 73, wherein the quality discriminator circuit is operative to output decoded data corresponding to a selected one of the first and second symbol representations based on a comparison of first and second qualities of the first and second symbol representations.

75. A receiver according to Claim 69, wherein the quality discriminator circuit is operative to output decoded data corresponding to a selected one of the first and second symbol representations based on a decoding of at least one of the first and second symbol representations.

76. A receiver according to Claim 69, wherein a first one of the first and second demodulation processes comprises a RAKE demodulation process, and wherein a second one of the first and second demodulation processes comprises a generalized RAKE (G-RAKE) demodulation process.

77. A receiver according to Claim 69, wherein the multi-process demodulator circuit comprises:

5 a correlator circuit operative to correlate the spread spectrum signal at a plurality of selected correlation times to produce a plurality of time-offset correlations; and

a correlation processor circuit operative to process the plurality of correlation times to generate a symbol representation.

10 78. A receiver according to Claim 77, wherein the correlation processor circuit comprises a combiner circuit operative to combine the plurality of time-offset correlations according to selected combining weighting factors.

15 79. A receiver according to Claim 78, wherein the discriminator circuit is operative to generate a quality indicator that indicates a quality of a symbol representation generated by the multi-process demodulator, and wherein the combiner circuit is operative to select the combining weighting factors responsive to the quality indicator.

20 80. A receiver according to Claim 77, wherein the discriminator circuit is operative to generate a quality indicator that indicates a quality of a symbol representation generated by the multi-process demodulator, and wherein the correlator circuit is operative to select the plurality of correlation times responsive to the quality indicator.

25 81. A receiver according to Claim 69, wherein the quality discriminator circuit comprises:

a decoder operative to decode the first and second symbol representations; and  
30 a quality indicator generator circuit operative to generate a quality indicator responsive to a decoding of a symbol representation.



82. A receiver according to Claim 81, wherein the quality indicator comprises a decoding metric.

5 83. A receiver according to Claim 81, wherein the quality indicator generator circuit comprises an error checking circuit.

84. A receiver according to Claim 69, wherein the receiver comprises a radio processor operative to receive a radio frequency spread spectrum communications signal and to generate a signal sample therefrom, and wherein the  
10 multi-process demodulator circuit is operative to generate the first and second symbol representations from the signal sample.

85. A receiver according to Claim 84, included in one of a wireless communications terminal or a wireless communications base station.  
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86. A receiver, comprising:  
a multi-process demodulator circuit operative to process a communications signal according to respective first and second demodulation processes to produce respective first and second symbol representations; and  
20 a quality discriminator circuit operative to decode a first one of the first and second symbol representations to determine a quality for the first one of the first and second symbol representations and, responsive to the determined quality, to determine whether to further process the first symbol representation or to decode the second symbol representation.  
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87. A receiver according to Claim 86, wherein the first and second demodulation processes comprise respective first and second spread spectrum demodulation processes.

30 88. A receiver according to Claim 87, wherein the first and second demodulation processes comprise respective ones of a RAKE demodulation process and a generalized RAKE (G-RAKE) demodulation process.

89. A receiver according to Claim 86, wherein the first and second demodulation processes comprise respective non-spread spectrum demodulation processes.

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90. A receiver according to Claim 86, wherein the quality discriminator circuit is operative to adaptively select the first one of the first and second symbol representations for first decoding.

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91. A receiver according to Claim 90, wherein the quality discriminator circuit is operative to select the first one of the first and second symbol representations for first decoding responsive to a partial decoding of at least one of the first and second symbol representations.

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92. A receiver according to Claim 90, wherein the quality discriminator circuit is operative to select the first one of the first and second symbol representations for first decoding responsive to a syndrome decoding of the first and second symbol representations.

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93. A receiver according to Claim 90, wherein symbol representations produced by the multi-process demodulator circuit comprise soft values that indicate a level of confidence in the symbol representations, and wherein the quality discriminator circuit is operative to select the first one of the first and second symbol representations for first decoding responsive to the soft output values.

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94. A receiver according to Claim 93, wherein the quality discriminator circuit is operative to select the first one of the first and second symbol representations for first decoding responsive to a history of the soft output values produced by the first and second demodulation processes.

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95. A receiver according to Claim 90, wherein the quality discriminator circuit is operative to select the first one of the first and second symbol representations for first decoding based on a decoding history.

5 96. A receiver according to Claim 95, wherein the decoding history comprises a decoding history of at least one of slot and a frame.

97. A receiver according to Claim 86, wherein the receiver further comprises a radio receiver operative to receive a radio frequency signal and to  
10 generate a signal sample therefrom, and wherein the multi-process demodulator is operative to generate the first and second symbol representations from the signal sample.

98. A receiver according to Claim 97, included in one of a wireless  
15 communications terminal and a wireless communications base station.

99. An apparatus for processing a spread spectrum signal, the method comprising:

means for correlating the spread spectrum signal with a spreading sequence at  
20 a first plurality of correlation times to produce a first plurality of time-offset correlations;

means for processing the first plurality of time-offset correlations to produce a first symbol representation for a symbol;

means for determining a first quality for the first symbol representation; and  
25 means, responsive to the determined first quality, for determining whether to further process the first symbol representation or to process a second symbol representation for the symbol generated from the spread spectrum signal.

100. An apparatus according to Claim 99, comprising means for generating  
30 the second symbol representation from the spread spectrum signal before determining whether to further process the first symbol representation or to process the second symbol representation for the symbol generated from the spread spectrum signal.

101. An apparatus according to Claim 99, comprising means for generating the second symbol representation from the spread spectrum signal after determining whether to further process the first symbol representation or to process the second  
5 symbol representation for the symbol generated from the spread spectrum signal.

102. An apparatus according to Claim 99, wherein the means for determining a first quality for the first symbol representation comprises:  
means for decoding the first symbol representation; and  
10 means for determining the first quality responsive to the decoding of the first symbol representation.

103. An apparatus according to Claim 102:  
wherein the means for decoding the first symbol representation comprises  
15 means for decoding the first symbol representation to generate decoded data; and  
wherein the means for determining the first quality responsive to the decoding of the first symbol representation comprises means for error checking the decoded data.

20 104. An apparatus according to Claim 103, wherein the means for error checking the decoded data comprises means for performing at least one of a cyclic redundancy check (CRC), a bit error rate determination, and a Reed-Solomon decoding of the decoded data.

25 105. An apparatus according to Claim 103, wherein the means for determining the first quality responsive to the decoding of the first symbol representation comprises means for generating a decoding metric as part of the decoding of the first symbol representation.

30 106. An apparatus according to Claim 99, wherein the means for determining a first quality for the first symbol representation comprises means for

determining a soft output that indicates a level of confidence in the first symbol representation.

107. An apparatus according to Claim 99, wherein the first symbol  
5 representation is an output of a RAKE demodulation process and wherein the second  
symbol representation is an output of a generalized RAKE (G-RAKE) demodulation  
process.

108. An apparatus according to Claim 99, wherein the means for  
10 determining whether to further process the first symbol representation or to process a  
second symbol representation for the symbol generated from the spread spectrum  
signal comprises means for determining whether to further process first decoded data  
corresponding to the first symbol representation or second decoded data  
corresponding to the second symbol representation.